R·I·T

Title: GCA Job Creation

Semiconductor & Microsystems
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Approved by:

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Process Engineer Equipment Engineer

1 SCOPE

The purpose of this document is to detail the creation of stepper jobs for the GCA. All users are expected to have read and understood this document. It is not a substitute for in-person training on the system and is not sufficient to qualify a user on the system. Failure to follow guidelines in this document may result in loss of privileges.

2 REFERENCE DOCUMENTS

3 INSTRUCTIONS

3.1 Introduction

3.1.1 These instructions provide an overview of creating stepper jobs for the GCA Stepper. The maximum field size on the wafer is X=20mm and Y=20mm.

3.2 Information needed to write a stepper job

3.2.1 **Die size** – The die size is needed to determine the number of rows and columns that will fit on the wafer.

3.2.2 **Alignment key offsets** – The alignment key offsets are needed if exposing more than one level. They tell the stepper the offset of the alignment marks relative to the center of the die. These are determined by the mask layout.

3.2.3 **Distance between alignment die** – The distance between the two die that are used for alignment must be 76.2 mm to match the spacing in the alignment microscope. If this is not possible, then secondary alignment marks may be used to create the 76.2 mm distance.

3.2.4 **Wafer diameter** – 100 mm or 150 mm. Pieces are considered 100mm.

3.2.5 **Exposure and focus** - Should be determined by the user with a focus exposure matrix for each layer.

3.2.6 **Aperture settings** – The aperture settings will determine what parts of the mask get blocked off. A 0 mm setting corresponds to wide open and a 50 mm setting corresponds to completely closed. Since the stepper reduces the image 5x, the aperture settings at wafer level will also be reduced 5x.

3.3 Determining the Number of Rows and Columns

3.3.1 **Step size**

3.3.1.1 Take (76.2/ die size) and round down to nearest integer

3.3.1.2 **Step size** = (76.2/ integer)

3.3.2 **Number of columns**

3.3.2.1 Take (wafer diameter/ step size) and subtract 1 to accommodate the flat.

3.3.3 **Number of rows**

3.3.3.1 Take (wafer diameter/ step size).

3.4 Creating a New Job

3.6.1 Start using the **SPEC** command and enter a jobname.

3.6.2 Now edit the job. Type **edit jobname**. The characters that need to be entered are indicated in bold.

3.5 Creating a Job with Multiple Layers

3.5.1 Near the end of the job after defining the aperture settings, the following will be displayed: **NAME (<CR> TO EXIT PASS SETUP):**

3.5.2 Put in the name of your second layer and press **return**.

3.5.3 Next select **Y** and **return** to copy another pass which you may then edit.

3.5.4 Repeat for additional layers.

3.6 Creating a Job with Multiple Layers on the Same Mask

3.6.1 In this case the mask may be divided into four quadrants, each with a different layer.

3.6.2 In the section of the job with the **Masking Aperture Offsets**, put in the correct offsets for the aperture blades.

3.6.3 These offsets will be different for each pass or layer since you will be using different parts of the mask for each layer.

3.7 Testing the New Job

3.7.1 Use the new job to expose a blank, resist coated wafer. Verify that the die are correctly positioned.

3.7.2 When exposing a second layer you will need to check the alignment verniers to determine any offsets necessary for good alignment. Enter the offsets in the x and y shift.

METRIC JOB CREATED: 8:30 23/05/95
UPDATE CREATION DATE? (*Y/N)..... return
JOB COMMENT:..... type in a comment and return

TOLERANCE (1,2,*3,4,5,6): 3..... return

SCALE CORRECTIONS
X, PPM (-200.000 → +200.000):..... return
Y, PPM (-200.000 → +200.000):..... return

ORTHOGONALITY, PPM (-200.000 → +200.000):..... return

LEVELER BATCH SIZE [1-25]: +1..... return (set to -1 for pieces to disable)

WAFER DIAMETER 100 or 150..... return

<< ARRAY PARAMETERS >>

STEP SIZE IN X:..... enter step size and return

*C-OUNT, S-PAN OR A-LL:..... return
NOW MANY COLUMNS?..... enter number of columns and return

STEP SIZE IN Y:..... enter step size and return

*C-OUNT, S-PAN OR A-LL:..... return
NOW MANY ROWS?..... enter number of rows and return

TRANSLATE ORIGIN
IN X:.....return
IN Y:.....return

DISPLAY? (Y/*N).....return

LAYOUT? (Y/*N).....return

ADJUST? (Y/*N).....return

<< ALIGNMENT PARAMETERS >>

STANDARD KEYS? (*Y/N).....return (if you choose no, you will be prompted for Right and Left Alignment Die Centers)

RIGHT KEY OFFSET
IN X: .....enter right alignment key and return
IN Y:.....enter left alignment key and return

EPI SHIFT
IN X:.....return
IN Y:.....return

<< PASS >>

NAME: 1.....enter a pass name and return
PASS COMMENT:.....enter a comment and return

EXPOSURE (SEC.):.....enter an exposure time in seconds and return

FOCUS OFFSET [-50 → +50]:.....enter a focus setting and return

USE LOCAL ALIGNMENT? (Y/*N):.....return

PASS SHIFT
X:.....return
Y:.....return

RETICLE BAR CODE: NONE.....return

MASKING APERTURE SETTING
XL:..... enter left blade setting and return
XR:..... enter right blade setting and return
YF:..... enter front blade setting and return
YR:..... enter rear blade setting and return

RETICLE ALIGNMENT OFFSET
XL:..... return
XR:..... return
Y:..... return

RETICLE ALIGNMENT MARK PHASE (P, *N, X): P..... choose p, n or x and return

A-RRAY OR P-LUG:..... A, return
DROPOUTS:..... return

<< END PASS SET-UP >>

SAVE PASS? (*Y/N)..... return

<< PASS >>

NAME (<CR> TO EXIT PASS SETUP):..... put in a new pass name or just return to exit without adding another pass
WRITE TO DISK? (*Y, N):..... return
PURGE EDITED FILES? (*Y, N):..... return

REVISION RECORD

Summary of Changes	Originator	Rev/Date
Original Issue	Sean O'Brien	A-06/01/2005
Modified for new stepper	O'Brien	B-03/11/2009
3.2.4, 3.7 added info on pieces, fixed some typos	Meller/O'Brien	C-04/27/2020